CLAIMS

1. A turbine blade comprising:

a hollow airfoil including a concave pressure sidewall and laterally opposite convex sidewall joined together at chordally opposite leading and trailing edges extending in span from a root to a tip;

a dovetail integrally joined to said airfoil at said root;

said airfoil further including a perforate first bridge spaced behind said leading edge and integrally joined to said pressure and suction sidewalls to define a leading edge channel therebetween;

said airfoil further including an imperforate second cold bridge spaced behind said first bridge, and extending integrally from said suction sidewall chordally aft to integrally join said pressure sidewall before said trailing edge to define a first serpentine flow channel adjacent said suction sidewall; and

said airfoil further including an imperforate third bridge disposed between said first and second bridges, and integrally joined at opposite ends to said pressure sidewall and said second bridge in a convex profile to define with said first bridge a complementary concave supply channel for channeling air through said first bridge, and to define with said second bridge a louver channel extending axially aft therealong to a distal end thereof at said pressure sidewall.

2. A blade according to claim 1 wherein said pressure sidewall includes an elongate outlet slot adjacent said distal end of said second bridge disposed in flow communication with said louver channel.

3. A blade according to claim 2 wherein:

said supply channel includes a first inlet extending through said dovetail;

said louver channel includes a second inlet extending through said dovetail behind said first inlet; and

said first serpentine flow channel includes a third inlet extending through said dovetail

behind said second inlet.

4. A blade according to claim 3 further comprising a recessed tip cap having a plurality of floor apertures therethrough disposed in flow communication with said leading edge channel, said supply channel, and said louver channel.

5. A blade according to claim 4 wherein:

said suction sidewall includes a row of film cooling apertures disposed in flow communication with said supply channel adjacent said second bridge 40; and

said third bridge is convex inside said supply channel to guide said air to said film cooling apertures.

6. A blade according to claim 5 wherein said louver channel includes a mesh pattern of pins spaced apart from each other and integrally joined at opposite ends to said second bridge and said pressure sidewall forward of said outlet slot for providing locally serpentine mesh cooling of said pressure sidewall.

7. A blade according to claim 6 further comprising a slant tier second serpentine flow channel disposed above said louver channel in flow communication therewith.

8. A blade according to claim 7 wherein said second serpentine channel is disposed in aft part over said first serpentine channel.

9. A blade according to claim 7 wherein:

said first serpentine channel consists of three flow reversing legs, and said second serpentine channel consists of three flow reversing legs; and

said first serpentine channel includes a refresher hole in a last leg thereof disposed in flow communication with said third inlet.

10. A blade according to claim 7 further comprising:

an outer bridge spaced inwardly from said tip cap to define a tip channel disposed in flow communication with said second serpentine channel for discharging air therefrom through a corresponding discharge aperture at said trailing edge;

a row of outer trailing edge slots 8 disposed in flow communication with said first serpentine channel, and terminating on said airfoil pressure sidewall before said trailing edge; and

a row of inner trailing edge apertures disposed in flow communication with said first serpentine channel, and extending chordally between said pressure and suction sidewalls to terminate through said trailing edge.

11. A turbine blade comprising:

a hollow airfoil including a concave pressure sidewall and laterally opposite convex sidewall joined together at chordally opposite leading and trailing edges extending in span from a root to a tip;

a dovetail integrally joined to said airfoil at said root;

said airfoil further including a perforate first bridge spaced behind said leading edge and integrally joined to said pressure and suction sidewalls to define a leading edge channel therebetween;

said airfoil further including a second cold bridge spaced behind said first bridge, and extending integrally from said suction sidewall chordally aft to integrally join said pressure sidewall before said trailing edge to define a first serpentine flow channel adjacent said suction sidewall; and

said airfoil further including a third bridge disposed between said first and second bridges, and integrally joined at opposite ends to said pressure sidewall and said second bridge to define with said first bridge a supply channel for channeling air through said first bridge, and to define with said second bridge a louver channel extending axially aft therealong to a distal end thereof at said pressure sidewall.

12. A blade according to claim 11 wherein:

said suction sidewall includes a row of film cooling apertures disposed in flow

communication with said supply channel adjacent said second bridge; and

said third bridge is convex inside said supply channel to guide said air to said film cooling apertures.

13. A blade according to claim 12 wherein said pressure sidewall includes an elongate outlet slot adjacent said distal end of said second bridge disposed in flow communication with said louver channel.

14. A blade according to claim 13 wherein said louver channel includes a mesh pattern of pins spaced apart from each other and integrally joined at opposite ends to said second bridge and said pressure sidewall forward of said outlet slot for providing locally serpentine mesh cooling of said pressure sidewall.

15. A blade according to claim 14 wherein:

said supply channel includes a first inlet extending through said dovetail;

said louver channel includes a second inlet extending through said dovetail behind said first inlet; and

said first serpentine flow channel includes a third inlet extending through said dovetail behind said second inlet.

16. A blade according to claim 14 further comprising a slant tier second serpentine flow channel disposed above said louver channel in flow communication therewith.

17. A blade according to claim 16 wherein said second serpentine channel is disposed in aft part over said first serpentine channel.

18. A blade according to claim 17 wherein said first serpentine channel consists of three flow reversing legs, and said second serpentine channel consists of three flow reversing legs.

19. A blade according to claim 17 further comprising a recessed tip cap having a plurality

of floor apertures therethrough disposed in flow communication with said leading edge channel, said supply channel, and said louver channel.

20. A blade according to claim 19 further comprising an outer bridge spaced inwardly from said tip cap to define a tip channel disposed in flow communication with said second serpentine channel for discharging air therefrom through a corresponding discharge aperture at said trailing edge.

21. A blade according to claim 14 further comprising:

a row of outer trailing edge slots disposed in flow communication with said first serpentine channel, and terminating on said airfoil pressure sidewall before said trailing edge; and

a row of inner trailing edge apertures disposed in flow communication with said first serpentine channel, and extending chordally between said pressure and suction sidewalls to terminate through said trailing edge.